

flareless fittings of the non-bite type may be used when the tubing system is of nickel-copper or copper-nickel. When making tube connections, the tubing must be cut square and flared by suitable tools. Tube ends must be annealed before flaring.

(3) Cocks are prohibited except for the solid bottom type with tapered plugs and union bonnets.

(4) Valves for gasoline fuel must be of a suitable nonferrous type.

(b) *Installation.* The installation of fuel lines, including pipe, tube, and hose, must comply with the requirements of this paragraph.

(1) Gasoline fuel lines must be connected at the top of the fuel tank and run at or above the level of the tank top to a point as close to the engine connection as practicable, except that lines below the level of the tank top are permitted if equipped with anti-siphon protection.

(2) Diesel fuel lines may be connected to the fuel tank at or near the bottom of the tank.

(3) Fuel lines must be accessible, protected from mechanical injury, and effectively secured against excessive movement and vibration by the use of soft nonferrous metal straps which have no sharp edges and are insulated to protect against corrosion. Where passing through bulkheads, fuel lines must be protected by close fitting ferrules or stuffing boxes. All fuel lines and fittings must be accessible for inspection.

(4) Shutoff valves, installed so as to close against the fuel flow, must be fitted in the fuel supply lines, one at the tank connection and one at the engine end of the fuel line to stop fuel flow when servicing accessories. The shutoff valve at the tank must be manually operable from outside the compartment in which the valve is located, preferably from an accessible position on the weather deck. If the handle to the shutoff valve at the tank is located inside the machinery space, it must be located so that the operator does not have to reach more than 300 millimeters (12 inches) into the machinery space and the valve handle must be shielded from flames by the same material the hull is constructed of, or some noncombustible material.

Electric solenoid valves must not be used, unless used in addition to the manual valve.

(5) A loop of copper tubing or a short length of flexible hose must be installed in the fuel supply line at or near the engines. The flexible hose must meet the requirements of § 182.720(e).

(6) A suitable metal marine type strainer, meeting the requirements of the engine manufacturer, must be fitted in the fuel supply line in the engine compartment. Strainers must be leak free. Strainers must be the type of opening on top for cleaning screens. A drip pan fitted with flame screen must be installed under gasoline strainers. Fuel filter and strainer bowls must be highly resistant to shattering due to mechanical impact and resistant to failure due to thermal shock. Fuel filters fitted with bowls of other than steel construction must be approved by the Commandant and be protected from mechanical damage. Approval of bowls of other than steel construction will specify if a flame shield is required.

(7) All accessories installed in the fuel line must be independently supported.

(8) Outlets in gasoline fuel lines that would permit drawing fuel below deck, for any purpose, are prohibited.

(9) Valves for removing water or impurities from diesel fuel in water traps or strainers are permitted. These valves must be provided with caps or plugs to prevent fuel leakage.

(c) *Alternative procedures.* A vessel of not more than 19.8 meters (65 feet) carrying no more than 12 passengers, with machinery powered by gasoline and a fuel system built in accordance with ABYC Project H-24, or 33 CFR 193, subpart J, or with machinery powered by diesel fuel and a fuel system built in accordance with ABYC Project H-33, will be considered as meeting the requirements of this section.

§ 182.458 Portable fuel systems.

(a) Portable fuel systems, including portable tanks and related fuel lines and accessories, are prohibited except where used for portable dewatering pumps or outboard motor installations.

(b) The design, construction and stowage of portable tanks and related fuel lines and accessories must meet the requirements of ABYC Project H-25, "Portable Gasoline Fuel systems for Flammable Liquids," or other standard specified by the Commandant.

[CGD 85-080, 61 FR 986, Jan. 10, 1996, as amended by CGD 97-057, 62 FR 51050, Sept. 30, 1997; CGD 85-080, 62 FR 51358, Sept. 30, 1997]

§ 182.460 Ventilation of spaces containing machinery powered by, or fuel tanks for, gasoline.

(a) A space containing machinery powered by, or fuel tanks for, gasoline must have a ventilation system that complies with this section and consists of:

(1) For an enclosed space:

(i) At least two natural ventilation supply ducts located at one end of the space and that extend to the lowest part of the space or to the bilge on each side of the space; and

(ii) A mechanical exhaust system consisting of at least two ventilation exhaust ducts located at the end of the space opposite from where the supply ducts are fitted, which extend to the lowest part of the bilge of the space on each side of the space, and which are led to one or more powered exhaust blowers; and

(2) For a partially enclosed space, at least one ventilation duct installed in the forward part of the space and one ventilation duct installed in the after part of the space, or as otherwise required by the cognizant OCMI. Ducts for partially enclosed spaces must have cowls or scoops as required by paragraph (i) of this section.

(b) A mechanical exhaust system required by paragraph (a)(1)(ii) of this section must be such as to assure the air changes as noted in Table 182.460(b) depending upon the size of the space.

TABLE 182.460(B)

Size of space in cubic meters (feet)		Minutes per air change
Over	Not over	
0	14 (500)	2
14 (500)	28.50 (1000)	3
28.50 (1000)	43 (1500)	4
43 (1500)	5

(c) An exhaust blower motor may not be installed in a duct, and if mounted

in any space required to be ventilated by this section, must be located as high above the bilge as practicable. Blower blades must be nonsparking with reference to their housings.

(d) Where a fixed gas fire extinguishing system is installed in a space, all powered exhaust blowers for the space must automatically shut down upon release of the extinguishing agent.

(e) Exhaust blower switches must be located outside of any space required to be ventilated by this section, and must be of the type interlocked with the starting switch and the ignition switch so that the blowers are started before the engine starter motor circuit or the engine ignition is energized. A red warning sign at the switch must state that the blowers must be operated prior to starting the engines for the time sufficient to insure at least one complete change of air in the space served.

(f) The area of the ventilation ducts must be sufficient to limit the air velocity to a maximum of 10 meters per second (2,000 feet per minute). A duct may be of any shape, provided that in no case will one cross sectional dimension exceed twice the other.

(g) A duct must be so installed that ordinary collection of water in the bilge will not block vapor flow.

(h) A duct must be of rigid permanent construction, which does not allow any appreciable vapor flow except through normal openings, and made of the same material as the hull or of noncombustible material. The duct must lead as directly as possible from its intake opening to its terminus and be securely fastened and supported.

(i) A supply duct must be provided at its intake opening with a cowl or scoop having a free area not less than twice the required duct area. When the cowl or scoop is screened, the mouth area must be increased to compensate for the area of the screen wire. A cowl or scoop must be kept open at all times except when the weather is such as to endanger the vessel if the openings are not temporarily closed.

(j) Dampers may not be fitted in a supply duct.

(k) A duct opening may not be located where the natural flow of air is unduly obstructed, adjacent to possible